electric generator facilities. In addition, the number of closed facilities that need decommissioning may continue to grow due to federal legislation. These workers are less affected by fluctuations in the economy because the facilities they work in must operate regardless of the state of the economy.

Earnings

Median hourly earnings of hazardous materials removal workers were $13.28 in 1998. The middle 50 percent earned between $10.76 and $17.85 per hour. The lowest 10 percent earned less than $9.26 per hour and the highest 10 percent earned more than $22.14 per hour.

According to the limited data available, treatment, storage and disposal workers usually earn slightly more than asbestos and lead abatement workers or decontamination technicians. Decontamination and decommissioning workers and radiation protection technicians, though comprising the smallest group, tend to earn the highest wages.

Related Occupations

Asbestos and lead abatement workers share similar skills with other construction trades workers, including bricklayers and stonemasons, concrete masons and terrazzo workers, insulation workers, and sheetmetal workers. Treatment, storage and disposal workers, decommissioning and decontamination workers, and decontamination and radiation safety technicians work closely with plant and system operators such as electric power generating plant operators and water and wastewater treatment plant operators.

Sources of Additional Information

For more information on hazardous materials removal workers, including training information, contact:

☛ Laborers-AGC Education and Training Fund, 37 Deerfield Rd., P.O. Box 37, Promfret, CT 06259.

Insulation Workers

(O*NET 87802)

Significant Points

- Opportunities for insulation workers are expected to be favorable because of high turnover.
- Most insulation workers learn informally on the job; others complete formal apprenticeship programs.

Nature of the Work

Properly insulated buildings reduce energy consumption by keeping heat in during the winter and out in the summer. Refrigerated storage rooms, vats, tanks, vessels, boilers, and steam and hot water pipes also are insulated to prevent the wasteful transfer of heat. Insulation workers install the materials used to insulate buildings and equipment.

Insulation workers cement, staple, wire, tape, or spray insulation. When covering a steam pipe, for example, insulation workers measure and cut sections of insulation to the proper length, stretch it open along a cut that runs the length of the material, and slip it over the pipe. They fasten the insulation with adhesive, staples, tape, or wire bands. Sometimes they wrap a cover of aluminum, plastic, or canvas over it and cement or band the cover in place. Insulation workers may screw on sheet metal around insulated pipes to protect the insulation from weather conditions or physical abuse.

When covering a wall or other flat surface, workers may use a hose to spray foam insulation onto a wire mesh. The wire mesh provides a rough surface to which the foam can cling, and adds strength to the finished surface. Workers may then install drywall or apply a final coat of plaster for a finished appearance.

In attics or exterior walls of uninsulated buildings, workers blow in loose-fill insulation. A helper feeds a machine with fiberglass, cellulose, or rock wool insulation while another worker blows the insulation with a compressor hose into the space being filled.

Insulation workers remove asbestos from buildings.

In new construction or major renovations, insulation workers staple fiberglass or rockwool batts to exterior walls and ceilings before drywall, paneling, or plaster walls are put in place. In major renovations of old buildings or when putting new insulation around pipes and industrial machinery, insulation workers often must first remove the old insulation. In the past, asbestos—now known to cause cancer in humans—was used extensively in walls and ceilings and for covering pipes, boilers, and various industrial equipment. Because of this danger, U.S. Environmental Protection Agency regulations require that asbestos be removed before a building undergoes major renovations or is demolished. When asbestos is present, specially trained workers must remove the asbestos before insulation workers can install the new insulating materials. (See the statement on hazardous materials removal workers elsewhere in the *Handbook*.)

Insulation workers use common handtools—trowels, brushes, knives, scissors, saws, pliers, and stapling guns. They use power saws to cut insulating materials, welding machines to join sheet metal or secure clamps, and compressors for blowing or spraying insulation.

Working Conditions

Insulation workers generally work indoors. They spend most of the workday on their feet, either standing, bending, or kneeling. Sometimes, they work from ladders or in tight spaces. The work requires more coordination than strength. Insulation work is often dusty and dirty, and the summer heat can make the insulation worker very uncomfortable. The minute particles from insulation materials, especially

when blown, can irritate the eyes, skin, and respiratory system. Workers follow strict safety guidelines to protect themselves from the dangers of insulating irritants, keeping work areas well ventilated, wearing protective suits, masks, and respirators, and taking decontamination showers when necessary.

Employment
Insulation workers held about 67,000 jobs in 1998. The construction industry employed 9 out of 10; most worked for insulation or other construction trades contractors. Small numbers of insulation workers held jobs in the Federal Government, in wholesale trade, and in shipbuilding and other manufacturing industries that have extensive installations for power, heating, and cooling. Most worked in urban areas. In less populated areas, carpenters, heating and air-conditioning installers, or drywall installers may do insulation work.

Training, Other Qualifications, and Advancement
Most insulation workers learn their trade informally on the job, although some workers complete formal apprenticeship programs. For entry jobs, insulation contractors prefer high school graduates who are in good physical condition and licensed to drive. High school courses in blueprint reading, shop math, sheet-metal layout, and general construction provide a helpful background. Applicants seeking apprenticeship positions must have a high school diploma or its equivalent, and be at least 18 years old.

Trainees who learn on the job receive instruction and supervision from experienced insulation workers. Trainees begin with simple tasks, such as carrying insulation or holding material while it is fastened in place. On-the-job training can take up to 2 years, depending on the work. Learning to install insulation in homes generally requires less training than insulation application in commercial and industrial settings. As they gain experience, trainees receive less supervision, more responsibility, and higher pay.

In contrast, trainees in formal apprenticeship programs receive in-depth instruction in all phases of insulation. Apprenticeship programs may be provided by a joint committee of local insulation contractors and the local union of the International Association of Heat and Frost Insulators and Asbestos Workers, to which many insulation workers belong. Programs normally consist of 4 years of on-the-job training coupled with classroom instruction, and trainees must pass practical and written tests to demonstrate knowledge of the trade.

Skilled insulation workers may advance to supervisor, shop superintendent, insulation contract estimator, or set up their own insulation business.

Job Outlook
Opportunities for insulation workers are expected to be favorable. Employment of insulation workers is expected to increase more slowly than the average for all occupations through the year 2008, but replacement needs are usually high due to the many workers who transfer to other occupations. Concerns about the efficient use of energy to heat and cool buildings will result in growth in demand for insulation workers in the construction of new residential, industrial, and commercial buildings. In addition, renovation and efforts to improve insulation in existing structures also will increase demand.

Despite growth in demand, replacement needs will account for most job openings. Each year thousands of jobs will become available as insulation workers transfer to other occupations or leave the labor force. There are no strict training requirements for entry, and many people with limited skills work as insulation workers for a short time and then move on to other types of work, creating many job openings.

Insulation workers in the construction industry may experience periods of unemployment because of the short duration of many construction projects and the cyclical nature of construction activity. Workers employed in industrial plants generally have more stable employment because maintenance and repair must be done on a continuing basis. Most insulation is applied after buildings are enclosed.

Earnings
In 1998, median hourly earnings of insulation workers were $12.25. The middle 50 percent earned between $9.71 and $15.94. The lowest 10 percent earned less than $7.52 and the highest 10 percent earned more than $22.62. Median hourly earnings in the industries employing the largest number of insulation workers in 1997 are shown below:

Miscellaneous special trade contractors	$12.90
Masonry, stonework, and plastering	10.80

According to the limited information available, average hourly earnings—including benefits—for insulation workers who belonged to a union and worked full time, ranged between $22.10 and $48.70 in 1998. Insulation workers in New York, Boston, San Francisco, Chicago, Los Angeles, Philadelphia, and other large cities received the highest wages. Insulation workers doing commercial and industrial work earn substantially more than those working in residential construction, which does not require as much skill.

Related Occupations
Insulation workers combine their knowledge of insulation materials with the skills of cutting, fitting, and installing materials. Workers in occupations involving similar skills include carpenters, carpet installers, drywall installers and finishers, floor layers, roofers, and sheet-metal workers and duct installers.

Sources of Additional Information
For information about training programs or other work opportunities in this trade, contact a local insulation contractor; a local chapter of the International Association of Heat and Frost Insulators and Asbestos Workers; the nearest office of the State employment service or State apprenticeship agency, or:

☛ International Association of Heat and Frost Insulators and Asbestos Workers, 1776 Massachusetts Ave. NW., Suite 301, Washington, DC 20036

☛ National Insulation Contractors Association, 99 Canal Center Plaza, Suite 222, Alexandria, VA 22314.

☛ Insulation Contractors Association of America, 1321 Duke St., Suite 303, Alexandria, VA 22314.

Painters and Paperhangers

(O*NET 87402A and 87402B)

Significant Points

- Painters and paperhangers are one of the larger construction occupations.
- Most painters and paperhangers learn their craft informally on the job as helpers to experienced painters.
- Opportunities for jobs should be good due to high job turnover in the occupation.

Nature of the Work
Paint and wall coverings make surfaces clean, attractive and bright. In addition, paints and other sealers protect outside walls from wear caused by exposure to the weather. Although some people do both painting and paperhanging, each requires different skills.

Painters apply paint, stain, varnish, and other finishes to buildings and other structures. They choose the right paint or finish for the surface to be covered, taking into account durability, ease of handling, method of application, and customers' wishes. Painters first prepare the surfaces to be covered so the paint will adhere properly. This may require removing the old coat by stripping, sanding, wire brushing, burning, or water and abrasive blasting. Painters also wash walls and trim to remove dirt and grease, fill nail holes and cracks, sandpaper rough spots,